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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/777,689	02/07/2001	Ji Hyun Hwang	MRE-08	3330

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EXAMINER	
JONES, JUDSON	

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/777,689	HWANG ET AL.	
	Examiner	Art Unit	
	Judson H Jones	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-3* is/are allowed.

6)☒ Claim(s) *4-18,23-25 and 28* is/are rejected.

7)☒ Claim(s) *19-22,26 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 February 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Applicant's arguments with respect to claims 1,2 4-20 and 23-26 have been considered but most of them are moot in view of the new ground(s) of rejection. The references and the arguments that are retained will be discussed in the rejections.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. 6,269,846 B1 in view of Lombardi 4,470,092 A, Emoto 6,226,073 B1, Hoover 5,838,359 A and Murate et al. 4,855,674 A. Overbeck et al. discloses a XY gantry using a linear motor as described in column 11 lines 11-22 but does not disclose any temperature measuring means. Lombardi teaches in column 3 lines 4-17 that motors may be damaged by overheating and teaches sensing the temperature of the motor. Since Overbeck et al. and Lombardi are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized temperature measuring means in the Overbeck et al. device in order to prevent damage to the motor from overheating. In regard to the "same field of endeavor" question, Lombardi is concerned with problems of overheating in motors, regardless of whether they are rotary or linear motors, or whether they are used in XY gantries or for anything else and Overbeck et al. has disclosed a motor. Lombardi teaches storing measured temperatures in column 3 lines 15-17 and teaches comparing measured temperatures with a pre-set temperature value in column 3 lines 9-13. Lombardi does not disclose computing a difference between the pre-set temperature value and the measured temperature. For Lombardi, the relevant

question is whether the measured temperature is within the pre-set range. Lombardi also does not explain the significance of the pre-set range. Murate et al. teaches in column 1 lines 41-43 that hunting is a problem for control systems, with the control apparatus continually making small changes in the variables and thereby driving the controlled variable either above or below the target value. The ranges of Lombardi eliminate the problem of hunting for a feedback control system. Since Murate et al. and Overbeck et al. as modified by Lombardi are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have used the disclosure of Murate et al. in order to understand the significance of the pre-set ranges in Lombardi. In regard to the "same field of endeavor" question, Murate et al. and Lombardi are both concerned with control systems and the teaching of Murate et al. is as valid for a control system used for controlling the temperature of a linear motor used in an XY gantry as it is for a control system controlling any other variable. Hoover teaches a refinement of feedback control where a difference between a pre-set target value and a measured value is computed in column 6 lines 27-30. See column 6 lines 21-36 for a discussion of the pre-set gain value in the control system. In Hoover, the pre-set gain value is +/-0.5 bit of the measured and pre-set digital values. Since Hoover and Overbeck et al. as modified by Lombardi are from the same field of endeavor (Murate et al. is not being mentioned here as having modified the device because Murate et al. was only used for explaining the operation of the device), it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the means for computing a variable gain corresponding to the computed variable difference between a measured and a pre-set value in order to increase the precision of the control system. Overbeck et al. as modified by Lombardi and Hoover discloses the control

system for measuring and controlling the temperature of a motor but does not disclose a fan or an air valve. Emoto teaches an air valve in column. Since Lombardi and Emoto are both feedback control systems for linear motors as shown in figure 3 and as described in Emoto column 3 lines 43-45 and thus are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized an air valve as taught by Emoto et al. in column 7 lines 51 ½ to 54 ½ in the device of Overbeck et al. as modified by Lombardi and Hoover in order to provide the cooling to the motor to overcome the heating problems described by Lombardi in column 1 lines 6-9.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi, Emoto, Hoover and Chitayat 6,069,416 A. Overbeck et al. as modified by Lombardi, Emoto and Hoover discloses the method for controlling cooling of a linear motor usable in an XY gantry but does not disclose measuring at least one of position and velocity with an encoder. Overbeck et al. in the abstract refers to reference surfaces for position control but does not explain what is meant by reference surfaces. Hoover in column 5 lines 9 ½ to 12 ½ suggests using an interferometer for detecting the position of the driven element. Chitayat teaches in column 1 lines 18 ½ to 25 ½ that either encoders or interferometers can be used for position detection and explains that interferometers are very accurate but expensive while encoders are cheaper but not as accurate. Since Chitayat and Overbeck et al. as modified by Lombardi, Emoto and Hoover are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized an encoder in a method for controlling the cooling of a linear motor in order to reduce the cost of the system. In regard to the "same field of endeavor" question here, Overbeck et al. is concerned

with precisely positioning an element movable in an XY plane and Chitayat is also concerned with positioning an element movable in an XY plane. In regard to the claimed feature of measuring temperature, storing the measured temperature, comparing the measured temperature to a preset value, computing a temperature difference and a temperature gain, driving a fan or a valve and then repeating the process, see Lombardi column 5 lines 1-16 for storing measured values and see Lombardi column 12 lines 28-42 for repeating the sequence.

In regard to claim 6, Overbeck et al. as modified by Lombardi discloses a system where both the position and temperature of a device is controlled. Overbeck et al. only discloses a control system for an XY gantry motor and Lombardi discloses a motor protector device which does not appear to measure position or velocity. According to Lombardi column 6 lines 15-25, the programmable motor protector receives signals from a motor control circuit. If position and velocity are being measured in the Lombardi system, they seem to be measured by the motor control circuit instead of the programmable motor protector. Emoto teaches in figure 3 using a single controller 14 for position measuring and for cooling control. Since Emoto and Overbeck et al. as modified by Lombardi are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a single controller for both temperature adjustment and motor control in order to reduce the parts needed to construct the machine and thus reduce the cost of the machine. In regard to measuring temperature values and then measuring position or velocity, if the device of Overbeck et al. as modified by Lombardi, Emoto, Hoover and Chitayat did not do go back to measuring position or velocity, then the device would not function. Without position information, reliable motor control commands to move the device would not be possible. Therefore the method of measuring

temperature and then returning to measure position or velocity is believed to be inherent in the device of Overbeck et al. as modified by Lombardi, Emoto, Hoover and Chitayat.

Claims 7, 9, 17, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi and Emoto. Overbeck et al. discloses a XY gantry using a linear motor as described in column 11 lines 11-22 but does not disclose any temperature measuring means. Lombardi teaches in column 3 lines 4-17 that motors may be damaged by overheating and teaches sensing the temperature of the motor. Since Overbeck et al. and Lombardi are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized temperature measuring means in the Overbeck et al. device in order to prevent damage to the motor from overheating. Overbeck et al. as modified by Lombardi discloses the control system for measuring and controlling the temperature of a motor but does not disclose a cooling device. Emoto teaches an air valve in column 7 lines 55-58. Since Lombardi and Emoto are both feedback control systems for linear motors as shown in figure 3 and as described in Emoto column 3 lines 43-45 and thus are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized an air valve as taught by Emoto et al. in column 7 lines 51 ½ to 54 ½ in the device of Overbeck et al. as modified by Lombardi in order to provide the cooling to the motor to overcome the heating problems described by Lombardi in column 1 lines 6-9.

In regard to claims 9 and 24, see Emoto column 7 lines 55-58.

Claims 8 and 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi, Emoto and Ludwig et al. 5,449,961 A (of record). Overbeck et al.

discloses a XY gantry using a linear motor having a cooling device but does not disclose the cooling device to be a fan. Ludwig et al. teaches using a fan instead of a valve to cool a motor in column 1 lines 24-26. Since Ludwig et al. and Overbeck et al. as modified by Lombardi and Emoto are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a fan to cool the device of Overbeck et al. as modified by Lombardi and Emoto. In regard to the "same field of endeavor" question, Ludwig et al. and Overbeck et al. as modified by Lombardi and Emoto are both motors and both address the problem of cooling a motor. While applicant argues that Ludwig discloses an electricity producing machine in which a rotary generator is rotated by a gas turbine, the title of the Ludwig et al. patent is "Electric Machine Cooling System," which implies that Ludwig et al. is teaching something a lot broader than how to cool an electricity producing machine in which a rotary generator is rotated by a gas turbine. According to *In re Pagliaro*, 210 USPQ 888 (CCPA 1981), "The determination that a reference is from a nonanalogous art is therefore twofold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the invention was involved." In this case, Ludwig et al. is relevant prior art under both tests.

In regard to claim 11, see Ludwig et al. column 4 lines 32-42. Ludwig et al. mentions temperature sensors instead of a single sensor and more specifically, sensing temperature within the gap and also overall generator temperature. To put this teaching in broader terms, Ludwig et al. teaches sensing overall machine temperature. Since linear motors also have gaps and have an overall machine temperature, this teaching would apply to linear as well as rotary motors.

Claims 10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi and Emoto as applied to claim 7 above, and further in view of Emshoff et al. (of record). Overbeck et al. as modified by Lombardi and Emoto discloses the linear motor cooling system but does not disclose first and second control signals to control first and second cooling systems. Emshoff et al. teaches in column 4 lines 52-67 a first cooling device comprising water flowing in hoses 18 and a second cooling device comprising a coolant gas also cooling the generator with separate sensors for sensing the temperatures of the cooling water and the cooling gas. Since Emshoff et al. and Overbeck et al. as modified by Lombardi and Emoto are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a second cooling device in a linear motor cooling system in order to cool the linear motor even if one cooling device failed to operate satisfactorily or did not provide sufficient cooling power, thus improving the efficiency of the motor.

In regard to claim 12, see Emshoff et al. column 4 lines 25-31.

In regard to claim 13, see Emshoff et al. column 4 lines 62-67. Since the coolant gas is circulated through the electromagnetic device of Emshoff et al., it cools both the stator and the rotor.

In regard to claim 14, Overbeck et al. as modified by Lombardi discloses a system where both the position and temperature of a device is controlled. Overbeck et al. only discloses a control system for an XY gantry motor and Lombardi discloses a motor protector device which does not appear to measure position or velocity. According to Lombardi column 6 lines 15-25, the programmable motor protector receives signals from a motor control circuit. Emoto teaches

in figure 3 using a single controller 14 for position measuring and for cooling control. Since Emoto and Overbeck et al. as modified by Lombardi are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a single controller for both temperature adjustment and motor control in order to reduce the parts needed to construct the machine and thus reduce the cost of the machine. In Emoto figure 3 element 4 is shown sending control signals the cooling capacity control means which then sends signals to the linear motor for controlling cooling and element 14 is also shown sending signals to driver 15 which controls movement of the linear motor.

Claims 15, 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi, Emoto, Emshoff and Leuthen 4,542,324 A (of record). Overbeck et al. as modified by Lombardi, Emoto and Emshoff discloses the cooling system for a gantry linear motor but does not disclose means for reducing the motor speed when the sensed temperature of the motor is above a predetermined temperature. Leuthen teaches this idea is column 7 lines 62-64. Since Leuthen and Overbeck et al. as modified by Lombardi, Emotor and Emshoff. are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized speed reduction means based on motor temperature in a linear motor for a gantry in order to protect the motor from damage from excessive heat.

Claims 16 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al. in view of Lombardi, Emoto and Yabu (of record). Overbeck et al. as modified by Lombardi and Emoto discloses the cooling system for the linear motor used in a gantry but does not disclose an environmental sensor. Yabu teaches that environmental factors are

important for gantry systems used in projection exposure devices and further teaches environmental sensors in the abstract of the patent. Since Yabu and Overbeck et al. as modified by Lombardi and Emotor are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized environmental sensors in the linear motor used in a gantry in order to increase the usefulness of the gantry pick and place system by making it usable for environmentally sensitive devices.

Allowable Subject Matter

Claims 1-3 are allowed.

Claims 19-22, 26 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach a system for cooling the linear motor of a gantry having an encoder, an encoder sensor, and an encoder periphery sensor attached proximate to the encoder or teach sensing the temperature of a stator and the temperature of a mover in combination with the other features of claim 1. In regard to claims 19 and 26, the prior art of record does not disclose or teach sensing the temperatures of the stator and of the mover combined with the other elements of the claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ 10/12/2003

Nicholas Ponomarenko
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